PATENT
Attorney Docket No. DPL-051

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPELLANTS:	Tudryn *et al.*	**CONFIRMATION NO.:**	4071
APPLICATION NO.:	10/677,087	**ART UNIT:**	1741
FILING DATE:	October 1, 2003	**EXAMINER:**	Lazorcik, Jason L.
TITLE:	Anodic Bonding of Silicon Carbide to Glass		

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REPLY BRIEF

This reply brief is submitted pursuant to 37 C.F.R. §41.41 in reply to the Examiner's Answer of October 27, 2010 ("Answer") and to address the Examiner's contentions in Section 10 of the Answer, which is entitled "Response to Argument." In particular, this brief addresses the Examiner's erroneous construction of Appellants' independent claims, his failure to provide sufficient prior art references, and his improper use of prior art references.

The Appellants believe that no fees are due in connection with the filing of this paper; however, in the event that any such fees are due, the Commissioner is hereby authorized to charge such fees to Deposit Account No. 07–1700.

ARGUMENT

I. The Examiner Erroneously Construes Appellants' Independent Claims 1, 17, and 24

In addressing the Appellants' arguments that the prior art references of record do not teach or suggest applying a voltage "*through electrical contacts in* *direct contact* *with*" the claimed layers to be bonded, the Examiner states that "[a]t the outset, it is noted that for two elements to be in electrical communication (e.g. in 'direct electrical contact'), they need not necessarily be directly physically abutting one another."[1] The Examiner then goes on to discuss how the prior art references of record teach or suggest electrical contacts in direct electrical contact with layers to be bonded.[2]

In essence, because the Examiner can not show that any prior art reference teaches or suggests electrical contacts in direct contact with the claimed layers to be bonded, the Examiner has himself impermissibly rewritten the claim language and changed its scope so as to be able to maintain his prior art rejections. The language of each of the independent claims clearly and plainly recites applying a voltage "*through electrical contacts in* *direct contact* *with*" the claimed layers to be bonded, and it should be interpreted as such.[3] The claim language should not be rewritten to read "*in direct electrical contact with.*"

Given the proper construction of the independent claims, the Examiner's rejections can not stand because, as set forth in the Appellants' Brief on Appeal (filed on August 11, 2010), none of the prior art references of record teach or suggest applying a voltage "*through electrical contacts in* *direct contact* *with*" the claimed layers to be bonded.[4]

II. The Examiner Fails to Provide a Reference That Discloses the Claimed "Direct Contact" Limitations of Appellants' Independent Claims 1, 17, and 24

On page 25 of the Answer, the Examiner asserts that "Berthold discloses a method of bonding a first wafer of glass to a second wafer of glass wherein the backside of each glass wafer is contacted by electrical contacts which are in themselves connected to a voltage source," which the Examiner interprets as teaching "electrical contacts . . . in direct contact with each of the first and second substrates to be anodically bonded."[5] The Examiner then states that "Berthold is pointed to merely as a teaching for an anodic bonding arrangement which would be construed as wholly conventional to a skilled practitioner in the arts at the time of the invention."[6]

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[1] Answer at page 21.
[2] Answer at pages 21–24.
[3] *Renishaw PLC v. Marposs Societa' Per Azioni*, 158 F.3d 1243, 1248-49 (Fed Cir. 1998); *Johnson Worldwide Assocs., Inc. v. Zebco Corp.*, 175 F.3d 985, 992 (Fed Cir. 1999).
[4] Appellants' Brief on Appeal at pages 8–10 and 15.

However, Berthold cannot be used as support for such an arrangement, and then be applied to a material that the arrangement specifically avoids directly contacting with electrical contacts. More specifically, as previously detailed in Appellants' Brief on Appeal, Berthold's thin film of silicon carbide is necessarily sandwiched between the two glass layers to assist in the bonding of those layers, and the electrical contacts cannot directly contact the thin film of silicon carbide during bonding.[7] Berthold can not properly be used in combination with Goesele to disclose "*electrical contacts in direct contact with . . . the material having an elastic modulus greater than about 300 gigaPascals*" when Berthold itself intentionally prevents direct contact between the electrical contacts and the silicon carbide (i.e., the material having an elastic modulus greater than about 300 gigaPascals).

Moreover, Appellants are not attacking the prior art references individually, but rather pointing out that none of the prior art references disclose the singular claim limitation of "*electrical contacts in direct contact with . . . the material having an elastic modulus greater than about 300 gigaPascals.*"

III. The Examiner Fails to Provide a Reference That Discloses the Claimed Temperature Limitations of Appellants' Independent Claims 17 and 24

In addressing the Appellants' arguments that none of the prior art references of record teach or suggest the limitations in Appellants' independent claims 17 and 24 that the temperature of the bonded layers not exceed about 350 °C while a voltage is applied, the Examiner asserts that Berthold "explicitly teaches that the process [i.e., the anodic bonding process] is enabled for temperatures of less than 400 °C."[8] However, the Examiner does not point to any teaching in Berthold of a specific temperature below 350 °C, precisely because the Examiner can not – no such teaching exists within Berthold. All temperatures disclosed in Berthold are at least 400 °C,[9] substantially in excess of the claimed upper maximum of about 350 °C.

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[5] Answer at page 25.
[6] Answer at page 26.
[7] Appellants' Brief on Appeal at pages 9–10.
[8] Answer at page 28.
[9] Appellants' Brief on Appeal at page 10.

IV. The Examiner Improperly Applies Berthold in Combination with Goesele and Lee in Maintaining the Rejection of Appellants' Independent Claims 17 and 24

In the Examiner's opinion, "a skilled artisan performing the bonding process according to Goesele would reasonably expect successful fabrication of anodic bonds at temperatures below 400 °C."[10] However, modifying Goesele in this manner would significantly reduce its effectiveness, as explained by Appellants in their Brief on Appeal.[11]

Both Goesele and Lee suggest that the bonding of a structure begin at 560 °C and that the bonded structure then be further heated to 725 °C (i.e., the splitting temperature) for optimal results (i.e., to achieve a minimal temperature differential between bonding and splitting treatments).[12] Based on a combination with Berthold, however, the Examiner suggests lowering the bonding temperature to below 400 °C. Disadvantageously, this would result in an almost 100% greater differential between the bonding and splitting temperatures than that disclosed by the combination of Goesele and Lee. Accordingly, Berthold can not be used to modify Goesele and Lee in this manner, as doing so renders their methods significantly less satisfactory for their intended purpose.[13]

V. The Examiner Fails to Provide a Reference That Discloses the Claimed Material of Appellants' Dependent Claims 8 and 9

As clearly explained in the Appellants' Brief on Appeal, Fukushima relies upon completely different materials from those claimed.[14] The Examiner addresses this fact by indicating (but, without providing any reasoning) that, in applying Fukushima's RMS surface roughness to the Appellants' claimed materials, one "having no more than an ordinary level of skill in the art at the time of the invention would expect to achieve the same or substantially similar behavior."[15] Regardless, however, of what Fukushima shows regarding surface roughness, it does not show a material having an elastic modulus greater than about 300 gigaPascals with the claimed RMS surface roughnesses.

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[10] Answer at page 28.
[11] Appellants' Brief on Appeal at page 12.
[12] Appellants' Brief on Appeal at pages 11–12.
[13] *In re Gordon*, 733 F.2d 900; 221 USPQ 1125 (Fed Cir. 1984); MPEP §2143.01.
[14] Appellants' Brief on Appeal at pages 13–14.
[15] Answer at pages 30–31.

VI. In Maintaining the Rejection of Appellants' Dependent Claims 8 and 9, the Examiner Completely Ignores that Fukushima Teaches Away from a Combination with Lee

As described in Appellants' Brief on Appeal, Lee describes a method of bonding a glass to a material having a surface roughness of no more than about 80 Å (i.e., 0.008 μm).[16] If Fukushima were combined with Lee in the manner proposed by the Examiner (i.e., to decrease the surface roughness), the combination would result in a surface roughness of less than 0.008 μm.[17] This direct teaching away from an RMS surface roughness of greater an 0.01 μm, as required by Appellants' dependent claims 8 and 9, is completely ignored by the Examiner in his Answer.

CONCLUSION

In view of the discussion above, Appellants respectfully submit that claims 1, 3, 5–17, 19, 20, and 24 are patentable in view of the cited references, and respectfully solicit reversal of the Examiner's rejections.

Respectfully submitted,

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[16] Appellants' Brief on Appeal at pages 14–15.
[17] Id.